PRAXAIR
SURFACE TECHNOLOGIES

Laser Cladding

Get more with laser cladding

With Praxair Surface Technologies, you get more protection from corrosion—and less chance for forced outages.

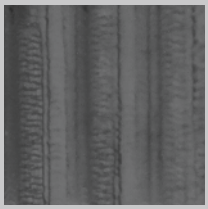
Get more than just an overlay.

Laser cladding delivers purer chemistry with a thinner, smoother overlay than traditional welding,

Traditional Welding

Application

- Mechanical impact on melt
- Up to 20% dilution
- High heat input can lead to part distortion and material malformation

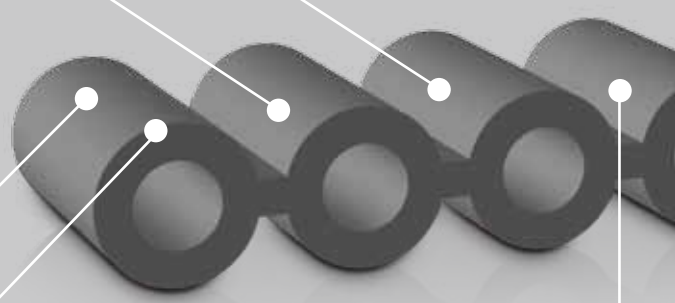


Texture

- Weld ripples
- Potential stress risers can lead to cracking
- Corrosion-inducing stress pockets possible

Geometry

- "Plateau" coating with more surface area susceptible to cracking



Thickness

- Inconsistent dilution of overlay material
- Thicker overlay (0.70" min.)

Heat Transfer

- Increased heat loss in waterwall
- Decreased efficiency
- Heat-cycling stress

FAQs:

Q: What's the biggest difference in the application of laser cladding vs. traditional welding?

A: Unlike traditional welding, laser cladding has no mechanical impact on melt, so there is a very low dilution (4–8%) of the deposited alloy. Additionally, traditional welding, because of how it's applied, generates intense heat that can distort the substrate. Laser cladding, however, has a low thermal input that helps reduce substrate distortion.

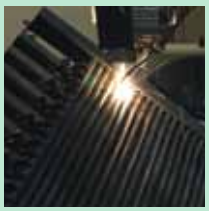
Q: What are the advantages of laser cladding?

A: The smooth surface of laser-clad coatings means there are no weld ripples. Traditional welding, like Metal Inert Gas (MIG) or Tungsten Inert Gas (TIG), can leave ripples in the surface of the coating that are stress risers and may cause circumferential cracking.

. . get peace of mind

giving you confidence that you'll be running maintenance-free for longer.

Laser Cladding

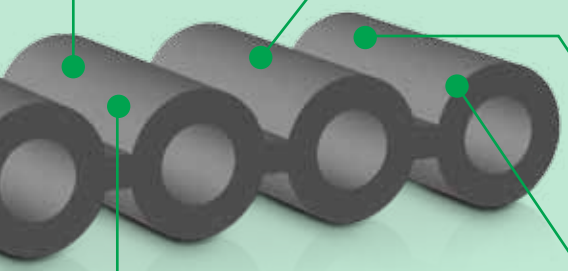


Application

- No mechanical impact on melt
- Low dilution (4–8%), minimal distortion
- Precisely controlled thermal input
- Automated process for uniformity

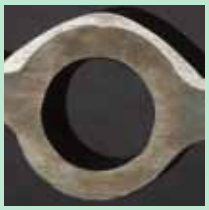
Get more experience

Our laser cladding services have coated over 500,000 ft² since 1996 without any measurable loss (UT) or visual inspection failures.



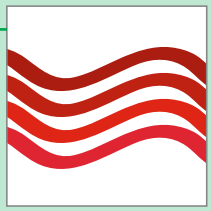
Texture

- Extremely smooth
- No weld ripples
- Elimination of corrosion-inducing debris pockets



Geometry

- "Peak" coating with less surface area susceptible to cracking
- Complex geometries possible



Heat Transfer

- Thinner coating leads to improved heat transfer
- Increased efficiency
- Minimum heat-cycling stress

Thickness

- Thinnest overlay (0.030" min. on panels)
- Purest chemistry/physical properties
- Easy to monitor (wastage rates)

Q: Since laser cladding produces a thinner overlay, does that mean there is less protection?

A: No. Laser cladding's thickness delivers a purer chemistry and better physical properties than traditional welding—which results in more chrome and less iron. Laser-clad overlays are metallurgically bonded and virtually impenetrable.

Service Experience

Allegheny Energy	5 stations since 1996
AEP	1 station since 2009
Cinergy	1 station since 1999
Constellation Energy	1 station since 2003
Consumers Power	1 station since 2003
Detroit Edison	4 stations since 2000
Dominion	1 station since 2005
Edison Mission Energy	1 station since 1997
First Energy	2 stations since 2001
Mirant	3 stations since 1999
PPL	2 stations since 1998
Reliant Energy	2 stations since 1998
Southern Co./Georgia Power	4 stations since 2001

What does it mean to get more with Praxair?

We go beyond the surface for individualized answers to your toughest problems.

At Praxair Surface Technologies we understand that your customers' requirements demand *more*. That's why we're dedicated to helping you deliver *more* product life, *more* ways to reduce operating costs, *more* ways to improve performance and *more* risk mitigation. Partner with us and you get more than protective overlays—you get complete access to our exclusive network of resources.

> *Serving the industry since 1996*

- Over 500,000 ft^2 installed
- R & S stamp certified

> *Common overlay materials*

- Stainless steels
  - Alloy type 309L, 312
- Nickel-based alloys
  - Alloy type 625, 622, 52

> *Part handling capacity*

- Panel widths up to 6 ft.
- Panel lengths up to 40 ft.
- Weights up to 20,000 lbs.

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